

## A COMMUNICATING APPARATUS

### BACKGROUND OF THE INVENTION

The present invention relates to a communicating apparatus for a telephone speech conducted via an external telephone connected to a personal  
5 computer.

It is possible today to achieve a telephone call from a personal computer (PC) in which an application software of telephone functions is installed. Moreover, image data can also be directly transmitted  
10 from a personal computer in which an application software of facsimile communications is loaded.

Most application programs of this type include a telephone directory function. Namely, in a case a telephone and facsimile numbers of a communication  
15 partner are beforehand registered to the directory of the application software, it is possible to automatically transmit the telephone or facsimile number to the partner only by indicating the partner in the directory list. Additionally, also when an external telephone is linked  
20 with the computer, the user desires to conduct a telephone call via the telephone book in many cases. After the directory is opened and the telephone call is established through a dialing operation, the call is carried out via the external telephone. Therefore, other  
25 operations can be accomplished by the computer.

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Moreover, when a facsimile transmission is achieved to send a manuscript, it will be more efficient depending on cases that the telephone directory is opened only to dial the call number of the partner and the  
5 contents of the manuscript are actually read and transmitted by an external facsimile device.

However, in the conventional method above, when conducting a call, the user is required to make a search for the telephone directory application in the computer  
10 and to initiate the application. When it is desired to immediately make a telephone call, the operation is troublesome and annoyance for the user. In some computer applications, when using the external telephone, the user is required to set the external telephone to an off-hook  
15 state so as to set the computer to an on-hook state. This leads to a drawback that the operation is bothersome and the telephone set can be used only by those who are versed in the operation technique.

#### SUMMARY OF THE INVENTION

20 It is therefore an object of the present invention, which has been devised to remove the problem above, to provide a communication apparatus for use with external communication terminals such as external telephones and facsimile facilities in which the user can  
25 immediately conduct a visual check of the telephone directory without conducting the troublesome initiating operation.

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To achieve the object above in accordance with the present invention, there is provided a communicating apparatus comprising <sup>an</sup> interface unit for establishing connection to a personal computer, an off-hook detecting unit for detecting an event that a telephone line is set to an off-hook state at initiation of communication, and <sup>a</sup> control unit for transmitting information of the detection from the off-hook detecting unit to a directory application initiation request unit integrally included in the personal computer. Thanks to <sup>this</sup> ~~the~~ configuration, the troublesome operation and knowledge conventionally required for the telephone call from an external telephone using a personal computer become unnecessary. Namely, with the provision of this communicating apparatus, the telephone call can be easily achieved without any particular knowledge.

In accordance with another aspect of the present invention, there is provided a communicating apparatus comprising an off-hook detecting unit for detecting an event that the telephone line is set to an off-hook state at initiation of communication and outputting therefrom information of the detection, a bell signal detecting unit for detecting a bell signal received from the telephone line and outputting therefrom information of the detection, <sup>a</sup> caller information detecting unit for detecting a caller telephone number notified to a call receiver by a caller telephone number notification service, and interface unit for controlling

a serial communication with a personal computer. The central control unit transmits information of the detection from the off-hook detecting unit and the bell signal detecting unit to a directory application

5 initiation request unit incorporated in the personal computer and information of a partner detected by the caller information detecting unit to the personal computer.

#### BRIEF DESCRIPTION OF THE DRAWINGS

10 The objects and features of the present invention will be come more apparent from the consideration of the following detailed description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a diagram schematically showing a  
15 configuration of an embodiment of the communicating apparatus in accordance with the present invention;

Fig. 2 is a perspective view showing an appearance of the communicating apparatus connected to a personal computer;

20 Fig. 3 is a diagram showing constitution of a line control unit of the communicating apparatus;

Fig. 4 is a flowchart showing a control procedure of a call issuing or originating operation in the embodiment;

25 Fig. 5 is a flowchart showing a control procedure of a call terminating operation in the embodiment; and

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Fig. 6 is a flowchart showing a control procedure of a call terminating operation in another embodiment of the present invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

5 Referring now to the drawings, description will be given of an embodiment in accordance with the present invention.

Fig. 1 shows in a block diagram the configuration of an embodiment of the communicating apparatus including an off-hook information detector and a call originator information detector in accordance with the present invention, Fig. 2 shows an appearance of the apparatus operated in connection with a personal computer, Fig. 3 shows in a circuit diagram the structure of a line controller of the communicating apparatus, and Figs. 4 and 5 are flowcharts showing operation of the apparatus.

The constitution of Fig. 1 includes a communication network 1 through which the communicating apparatus of the embodiment communicates with other terminals and a line controller 2 to conduct functions such as a function to establish interface for the network 1. The controller 2 includes an off-hook detecting unit 2a to detect at initiation of a communication that the telephone line is set to the off-hook state and a bell signal detecting unit 2b to detect a bell signal received via the network 1. The controller 2 further achieves

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various functions such as an impedance matching function with respect to the network 1, a signal amplifying function, and a two-wire to four-wire converting or transforming function.

5                   Moreover, the embodiment includes a personal computer (PC) interface 4 for the connection with a personal computer<sup>8</sup> and a modem 5 to connect thereto an external data communicating device 30, or an external facsimile apparatus, or the like for data communication.

10                   The system further includes a caller identifier (ID) detecting unit 6 to detect a caller's telephone number notified to the receiver through ~~an~~<sup>an</sup> originating telephone number notification service. Specifically, the unit 6 extracts telephone number information from signals  
15 demodulated by the modem 5. There is also included a central control unit 7 to control the off-hook detector 2a, the modem 5, the caller ID detector 6, and the PC interface 4 linked with a personal computer 8. The ~~central control unit~~<sup>central control unit</sup> ~~controller~~ 7 supervises these units in accordance with a  
20 procedure shown in the flowcharts of Figs. 4 and 5 to resultantly transmit off-hook information and caller information to the computer 8. The ~~central control unit~~<sup>central control unit</sup> ~~controller~~ 7 includes a storage 7a.

                  The line controller 2 will be described by  
25 referring to Fig. 3. In the diagram, 16a, 16b, and 17 respectively indicate a chip wire, a ring wire, and a rectifier. A ~~reference numeral 18 stands for a photo-~~<sup>18 is</sup> interrupter~~x~~ disposed in the off-hook detector 2a. When

an external telephone or the like is set to an off-hook state to lower a voltage between the chip wire 16a and the ring wire 16b of the telephone line, off-hook information is outputted to <sup>the</sup> output terminal hook of the photo-interrupter 18 to be sent to the central <sup>control unit</sup> controller 7. A ~~numeral 19 denotes a~~ photo-interrupter <sup>19 is also</sup> arranged in the bell signal detector 2b. When a bell signal is received from the network 1, a pulse wave is outputted to <sup>the</sup> output terminal bell to be delivered to the ~~controller~~ <sup>central control unit</sup> 7.

10 A ~~numeral 20 is a~~ transformer <sup>20</sup> to ~~interrupt~~ <sup>interrupts</sup> a direct current and to conduct a two-wire/four-wire conversion. ~~numeral 21 indicates a~~ receiver amplifier <sup>21 is</sup> installed in a receiver-side signal path, and ~~a numeral 22 designates a~~ sender amplifier <sup>22 is</sup> disposed in a sender-side signal path.

15 ~~Numerals 24 and 25 respectively indicate a~~ microphone <sup>24</sup> and a loudspeaker <sup>25</sup> ~~for the user to conduct~~ <sup>allow a</sup> telephone speech without using hands. ~~Numerals 26 and 27~~ <sup>an</sup> ~~respectively denote an amplifier to amplify~~ <sup>amplifier 26 amplifies</sup> a signal outputted from the microphone 24 and an amplifier <sup>27</sup> ~~which~~.

20 ~~causes the speaker 25 to sound. Numerals 28 and 29~~ <sup>28 connects</sup> ~~respectively indicate a jack to connect~~ a handset to the system and a switching unit <sup>29</sup> ~~which~~ establishes and changes connections of signal paths between the receiving and transmitting sides.

25 As can be seen from Fig. 2, the communicating apparatus 3 of the embodiment is coupled with the personal computer 8 in which telephone directory application software is loaded. The PC interface of the

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apparatus 3 is linked with a serial interface of the computer and hence the apparatus 3 can communicate information with the computer 3 in a serial communication. ~~Reference numerals 15 and 8a respectively~~  
5 ~~designate~~ <sup>a</sup> liquid-crystal display <sup>15 is</sup> arranged in the apparatus 3 and a display <sup>8a is</sup> integrally disposed in the computer 8.

In Fig. 1, ~~a numeral 9 indicates~~ an application (APL) initiation request unit <sup>operates</sup> ~~9 operating~~ in the computer  
10 8. The unit 9 continuously monitors an event from the off-hook detector 2a of the apparatus 3 in accordance with the present invention.

The computer 8 includes a hard disk device 10. Information stored in the device 10 can be displayed on  
15 the display 8a. ~~Numerals 11 to 13 respectively indicates~~  
<sup>Fig. 1 also shows</sup> <sup>11</sup> a display example <sup>12</sup> of a directory window of the directory window application software initiated by the request unit 9, a display example <sup>13</sup> of caller information by the software at call termination, and a display example <sup>13</sup> in  
20 which the user inputs a memo during a speech.

<sup>an</sup> ~~A numeral 14 designates an~~ external telephone set <sup>14 allows</sup> ~~for~~ the user to conduct ~~a~~ speech by phone. The telephone set 14 is connected to the chip and ring wires 16a and 16b in a parallel fashion. When the telephone 14  
25 is set to an off-hook state, the voltage between the chip and ring wires 16a and 16b is reduced.

Referring next to the flowcharts of Figs. 4 and  
5, description will be given of <sup>the</sup> operation of the

communicating apparatus constructed as above in  
accordance with the present invention.

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First, referring to Fig. 2, description will be  
given of an operation to originate call. The application  
initiation request unit 9 appropriately monitors the  
5 serial interface of the computer 8 to receive an off-hook  
event from the off-hook detector 2a (step S1).

At the same time, the detector 2a continuously  
makes a check to determine whether or not the external  
10 telephone 14 is set to an off-hook state (step S2). When  
the telephone 14 is set to an off-hook state, there flows  
a current between two wires 16a and 16b of the telephone  
line and hence the voltage therebetween is decreased.  
The detector 2a detects the voltage drop (step S2) to  
15 transmit off-hook information via the serial interface to  
the computer 8 (step S3).

Having recognized the off-hook state of the  
telephone 14 in accordance with the off-hook information,  
the application initiation request unit 9 of the computer  
20 8 initiates the telephone directory application software  
(step S4).

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With provision of the unit 9 and the detector  
2a above, when the user carries out a speech through an  
external telephone by use of a personal computer, the  
25 troublesome operation to detect the telephone application

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software and/or the telephone directory application  
becomes unnecessary not  
software. It is neither required for the user to be  
versed in the ~~software~~ application software  
telephone connected to the

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personal computer. Additionally, after the directory is opened and the partner's call number is dialed, the speech is accomplished by the external telephone.

Consequently, the personal computer is <sup>solely</sup> not dedicatedly <sup>to be</sup> used for ~~the~~ speech, namely, it is possible to achieve <sup>another</sup> ~~other~~ operation by the computer.

Referring now to Fig. 5, description will be given of <sup>the</sup> operation of the apparatus at call termination. When a bell signal is received from the network 1, the external telephone 14 rings (step S1). At the same time, the caller ID detector 6 detects under control of the line controller 2 information of a partner (caller information) having issued the telephone call and then notifies the information to the central <sup>control unit</sup> ~~controller~~ 7 (step S2). The <sup>central control unit</sup> ~~controller~~ 7 <sup>at</sup> stores the caller information in the storage 7a.

The number of bell signals from the network 1 is counted (step S3) to determine whether or not the count value is equal to a predetermined value (step S4). If this is the case, the line controller 2 automatically closes the telephone line (step S5) and then a current flows between two wires of the telephone line to lower the voltage therebetween.

Having detected the voltage drop, the off-hook detector 2a sends off-hook information via the serial interface to the computer 8 (step S6).

Moreover, the information including the partner's telephone number and the like which has been

notified from the network 1 and which has been stored in the storage 7a as described above is also sent via the PC interface 4 to the computer 8 (step S7).

The application initiation request unit 9 continuously monitors the serial interface of the computer 8 to receive an off-hook event from the off-hook detector 2a. On receiving the event (step S8), the unit 9 of the computer 8 invokes the directory application software in accordance with the off-hook information (step S9).

Having received the caller information via the PC interface 4 of the apparatus (step S10), the software of the computer 8 accesses a database stored in the hard disk device 10 to read therefrom detailed information related to the received caller information (step S11) and then displays the detailed information on the display 8a as shown in the display example 12 of Fig. 1 (step S12). It is therefore possible to obtain partner's information in the past.

As <sup>described</sup> above, in accordance with the communicating apparatus of the embodiment, the application software of the personal computer can be initiated in association with the closing of the telephone line. Consequently, detailed information of the <sup>partner</sup> ~~part~~ can be read from the storage of the computer 8 to be displayed on the screen, namely, it is possible to confirm the partner's detailed information before the telephone speech is started.

Subsequently, description will be given of a

function to input memos in the system. Detailed information of a partner as a call originator can be inputted from a memo input screen to the system during or after a speech. When the external telephone 14 is set to the off-hook state or the memory input screen is activated in the directory application software, the processing of Fig. 5 is executed and then the memo input screen is displayed as the display example 13 of Fig. 1. In this situation, the user can input a record of the speech with the call originating partner to the system (step S13).

For example, when the user inputs the contents of speech to the system and terminates the computer application software, a record of the contents thus inputted is stored in the hard disk device 10 corresponding to caller information of the partner (step S14). Thanks to the provision, when a call is received from the same partner, the contents previously recorded can be displayed on the screen.

Referring next to Fig. 6, description will be given of an alternative embodiment of the communicating apparatus in accordance with the present invention. This embodiment differs in the <sup>operating</sup> ~~operation~~ procedure from the preceding embodiment. In Fig. 6, when a bell signal is received via the network 1, the external telephone 14 rings. On this occasion, the bell signal detector 2b detects the reception of the bell signal to send information of the signal detection to the central

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Having received the off-hook information, the computer 8 reads by the software the database in the disk device 10 to attain detailed information associated with the caller information (step S9) and then presents the  
5 detailed information on the display 8a as shown in the display example 12 of Fig. 1 (step 10).

In accordance with the communication apparatus of this embodiment described above, immediately after the reception of the bell signal the directory application  
10 software is initiated in the computer 8 before the user raises the handset of the telephone 14. Consequently, the user can visually check the caller information as early as possible. In addition, when the caller information transmitted together with the bell signal is  
15 detected, only the caller name corresponding to the caller information is read by the directory application software to be presented on the display. This advantageously reduces the period of time to access the objective item. The user can recognize the caller name  
20 during quite a short period of time after the telephone bell starts ringing to thereby recognize whether or not the handset is to be raised.

In the example above, the telephone speech is accomplished by an external telephone. However, the  
25 communicating apparatus of the present invention may be a facility including a function of voice speech, i.e., a voice amplifying function, a handset, and the like. In operation of any communicating apparatus integrally

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including the voice speech function, the directory application software can be initiated in the personal computer only by raising the handset thereof. Only by specifying a call terminating partner in a directory  
5 list, a telephone number of the partner can be automatically transmitted therefrom, which advantageously simplify the telephone operation.

Furthermore, the communicating apparatus in accordance with the present invention may include, for  
10 example, an image reading device for facsimile communication. After the contents of a manuscript are read by the image reader, the user can initiate the directory application software in the computer by a simple operation to close the line, i.e., by depressing  
15 an off-hook or monitor button. The user then need only specify a call terminating partner in a directory list to automatically send a telephone number of the partner therefrom.

As above, in accordance with the present  
20 invention, there is provided a communicating apparatus in which when the user to easily carry out a telephone speech with an external telephone of a personal computer, the troublesome operation and knowledge required to make a search for a telephone or telephone directory  
25 application software of the computer become unnecessary, which advantageously facilitates the telephone operation.

While the present invention has been described with reference to the particular illustrative

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